

# Amateur Radio

MØMTJ

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## AERIALS ( ANTENNAS ) 1

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*"Success is 90% antenna and 10% rig. Hobby is 90% listening 10% transmitting" - MMØHDW.*

### AERIALS used by MØMTJ

This page shows some the antennas that I have used over the course of time.

Index To Other Antenna Pages:

[Antennas 1](#) : Aerials used by MØMTJ

[Antennas 2](#) : Including ideas for compact aerials for Top Band /160 metres

[Antennas 3](#) : Felix Scerri VK4FUQ discusses Loop Aerials, baluns, masts & other antenna related topics

[Antennas 4](#) : Many antenna ideas from various sources particularly for multi-band operation & also gives information about

[antenna trimming](#), [knots for wire antennas](#) and useful aerial [rigging accessory](#) ideas.

[Antennas 5](#) : Half Wave (physically end fed) aerials for 144 MHz VHF / 430 MHz UHF and 50 MHz 6 Metre band & J-Pole Aerials

[Antennas 6](#) : Simple and effective H.F. Aerial ideas: The All Band Doublet, an All Band Sloper & a Ground Plane Aerial

[Antennas 7](#) : Omni-Directional - Circularly (Mixed) Polarized Aerial for VHF / 2 Meters.

### 2014 : Current Set Up - as at September 2014:

The Summer of 2014 has seen a few changes of aerials. The 80m/40m Inverted L was removed and replaced with a newly constructed Doublet Antenna fed with ladder line via a 4:1 G-Whip current balun and an LDG "ATU". The Tecadi support pole originally used for the Inverted L is now used to support one end of the Doublet. You have probably read this elsewhere, but I can confirm that the All Band Doublet (fed with ladder line *not* coax) is a superb all round HF aerial. Highly recommended.

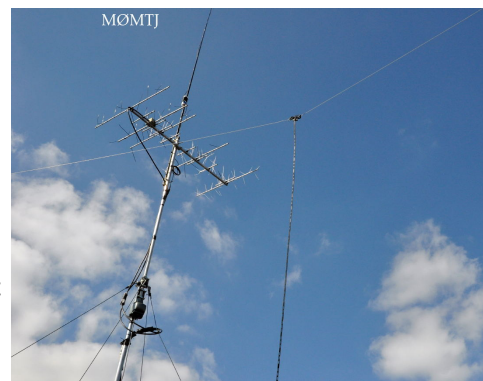
The SGC-230 Automatic Antenna Coupler was moved from the original feedpoint of the Inverted L antenna to the second feed-point on the other side of the garden. This now feeds a sloping wire of approximately 20 meters length to ensure that the 80 Meter Band and Top Band (160 meters) remain available. This antenna will also 'tune' on most other bands, so remains a very useful second antenna, though the All Band Doublet is often considerably better, particularly on the higher frequencies. The old SGC-230 was also faulty and I replaced it with a new CG-3000 auto coupler from Martin Lynch and Sons.

The J-Pole for 4 Meters (70 MHz) was removed since it wasn't used much, being only connected to a 4m hand-held radio - it seemed to be a waste of precious antenna space. This was replaced with a newly constructed Half Wave "CFR" Antenna (Coaxial Dipole) for 6 Meters (50 MHz) connected to the main HF radio via Westflex 103 coax. The DK7ZB dual band Yagi antenna remains, as does the 10m / 6m Fan Dipole in the loft space. Also remaining in place at the apex of the house is the home-brew 2m / 70cm "CFR" Antenna (Coaxial Dipole) for VHF/UHF FM operation - this has been a particularly effective antenna.

To summarise:

1) A 20 meter long doublet antenna fed with balanced ladder line for 40 meters to 6 meters. The 'old timers' really knew their stuff, this an excellent all round antenna that is easy and cheap to make and should be quite easy to accommodate and install. See photograph below and [read more here](#)

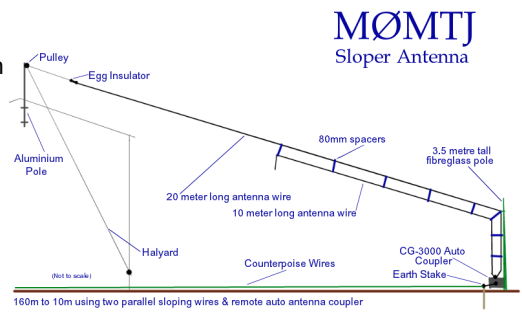
2) A Sloper Antenna consisting of two parallel wires - one wire being 20 meters long with a second parallel wire



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ANTENNAS](#)



that is 10 meters in length. The first 2.5 meters (approx) of wire runs vertically up a non metallic post, then the remainder slopes back towards the house being finished off with an insulator which is attached to a Para-Cord lanyard that runs through a pulley on a pole at the apex of the roof. The antenna wire can therefore easily be let down for maintenance or adjustment whenever required. For lowest possible loss, the antenna is fed via a GC3000 automatic antenna coupler located at the bottom of the garden. The antenna is primarily for lower HF bands including 160 meters, 80 meters and 40 meters, but it also works very well on some higher bands. The GC3000 itself is mounted in a waterproof IP56 rated enclosure near ground level at the bottom of the garden. Grounding is achieved from two 4 foot long copper ground stakes and several radial grounding wires.



[Read more about the Sloper Antenna and the CG3000 here.](#)

3) A 'home-brew' omnidirectional, vertical dual band, end fed antenna for 2 metres and 70cm. This is of the Controlled Feeder Radiation design (CFR) by VK2ZOL; effectively an end fed half wave dipole on 2m with an aluminium sleeve dipole section to achieve 70cms with a few extra dB's of gain. It is mounted on an aluminium mast. It's feed-point is about 11 metres a.g.l. [read more here](#)

4) A DK7ZB design dual band Yagi antenna, with 5 elements for 2 metres and 8 elements for 70cms, mounted horizontally for SSB. A lightweight antenna rotator is employed and uses a push-up telescopic mast. Height above ground level is again approximately 7 metres. The DK7ZB is an excellent twin band Yagi antenna. [read more here](#)

5) A Half Wave End Fed / Controlled Feeder Radiation (CFR) antenna for 6 meters / 50 MHz. Supported by a 3 meter long telescopic fibreglass fishing pole attached to the top of the aluminium push up mast that supports the DK7ZB dual band yagi and rotator.

6) Dual Band Fan Dipole, made from thick loudspeaker wire, mounted horizontally in the loft space for 10 metres and 6 metres. Cheap & quite effective.



[SOTA Beams  
Lightweight 2 metre &  
70cms Yagis, Dipole,  
Accessories & Poles  
www.sotabeams.co.uk](#)

*Other Options that can be deployed on an 'as required basis' :*

7) A half wave Wire J-Pole fixed to a telescopic fibreglass fishing pole for 10m. Cheap and effective. [more about J-Poles here](#) and [also here on Antenna page 5](#)

8) Compact Loaded Top Band Antenna, based on a design idea by Stuart Craigen G4GTX [more](#)

9 & 10) G Whip End Fed Zepps (EFZ's) for either 20m, 15m or 17m or the G-Whip "WideBander" which is an 'UnTenna' style antenna that can be used for 20m through to 10m using good quality G Whip 9:1 UnUn; useful additions for antenna flexibility. [more](#)

11) N9TAX Dual Band Slim Jim (J-Pole) antenna mounted in the loft as a back-up antenna for 2m and 70cms. Very good. [more](#)

12) Delta Loop Antenna - 16 metre loop of wire in triangular Delta shape, hung from the top of the pole supporting the inverted L antenna and fed via RG213 coaxial cable via a 4:1 balun. The loop is really a single band antenna cut for one wavelength on the band of interest, however it also can be pressed into service for some higher bands - a good, cheap and easy to install aerial; Often works better than the inverted L on the higher bands, but on 10 metres the tuned 10 metre dipole in the loft is sometimes better. [more](#)

Knots: Knots for securing wire aerials and other things more [here](#)

## H.F. ANTENNAS used by MØMTJ

### All Band Doublet Antenna

The Doublet Antenna consists of two 10 meter long top wires to form the 20 meter long 'dipole' section. The centre is fed with Ladder Line rather than coaxial cable. A dipole fed with coaxial cable is essentially a single band (mono band) antenna. Feeding such an aerial with ladder line, or open wire twin feeder makes a much more effective multi-band antenna.

The ladder line runs down to a high efficiency 4:1 Current Balun (G-Whip) which is connected to an LDG AT-200 automatic antenna matching unit via a very short RG213 patch lead to ensure lowest losses. The Antenna tuner and balun are housed in a box which is itself contained in a small garden shed to protect it from the weather. The LDG antenna matching unit is then connected back to the 'shack' via a run of RG-213 coaxial cable. [Read more](#)

[about the All Band Doublet Antenna here.](#)



A view of part of the MØMTJ All Band Doublet Antenna

[Read more here](#)

## ANTENNAS FOR VHF and UHF - 2 m & 70 cms

The main antennas are as follows:

### Home-Brew dual band end (physically end fed) half wave "Coaxial Dipole" for 2m & 70cm

For 2m and 70cm FM I use a mounted on a lightweight aluminium telescopic pole on the apex of the hose. The base of the antenna (the bottom of the radiating element) is approximately 11 metres above ground level. This antenna is based on the Controlled Feeder Radiation principle (CFR) and is described by VK2ZOI. [Read more about its construction here.](#) Also seen in the photograph below are the ropes that support the H.F. wire aerials.



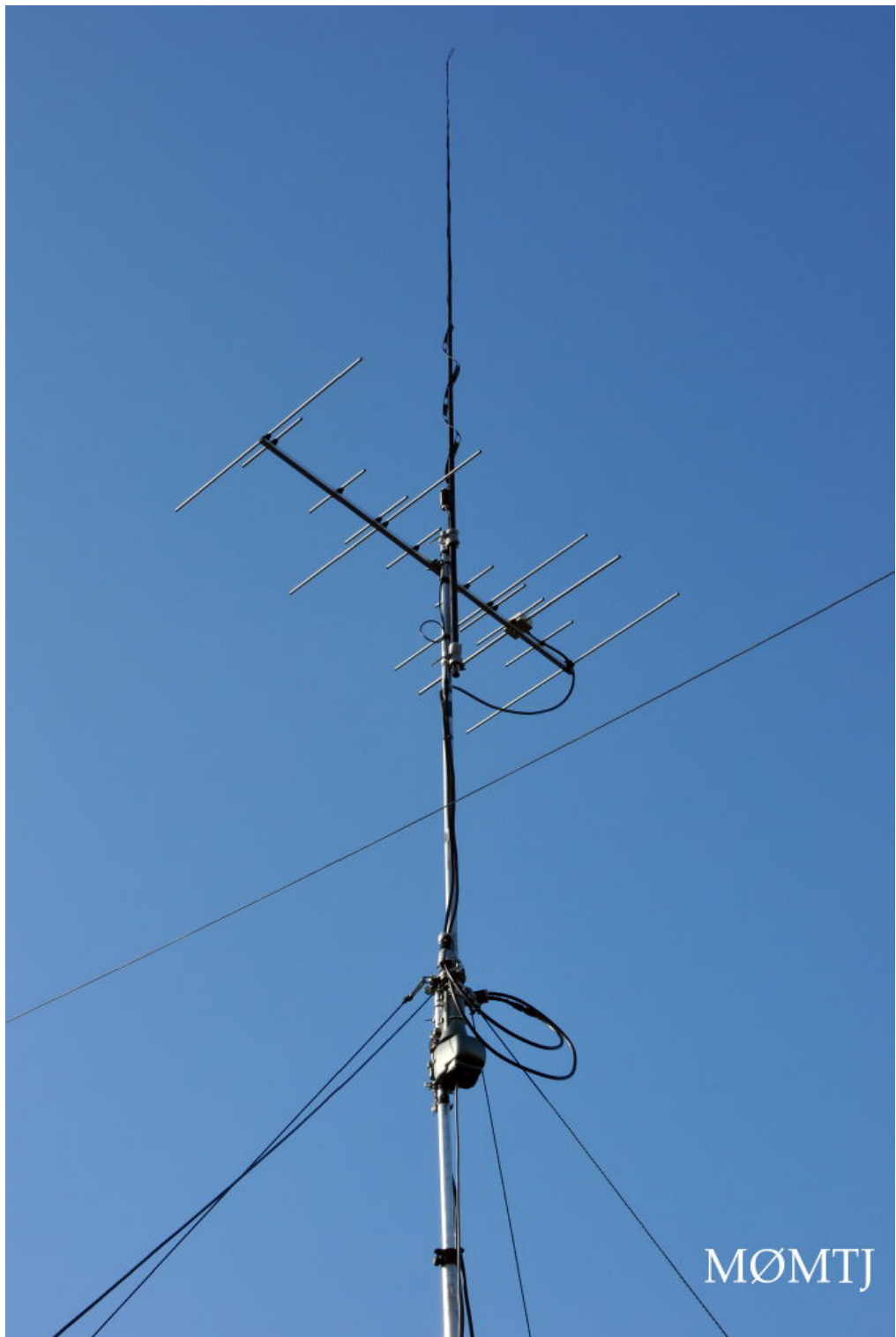
Home brew dual band vertical antenna for 2 metres and 70 cms

[Read more about its construction here](#)

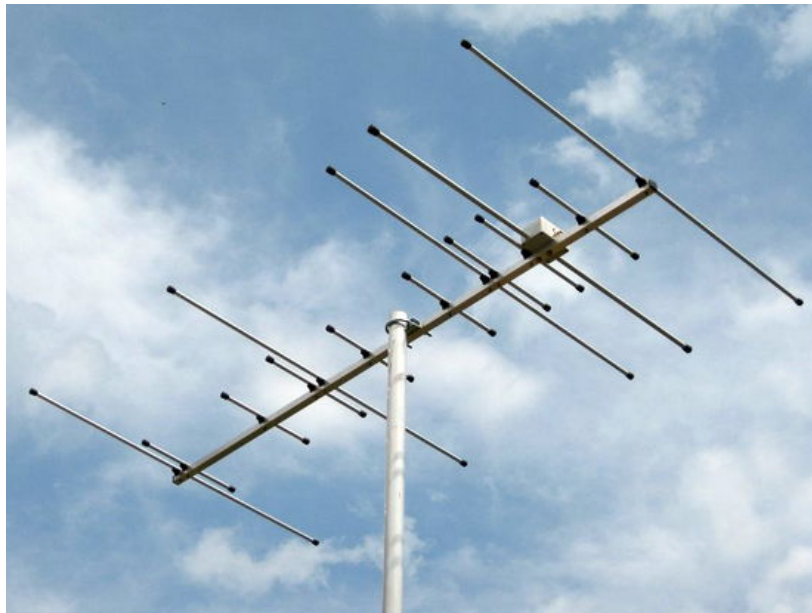
### Dual Band Yagi for 2m & 70cm

For 2 metres and 70cms SSB there is a horizontal DK7ZB design dual band Yagi antenna. This has 5 elements for 2 metres and 8 elements for 70 cms. A lightweight antenna rotator is employed and uses the same push-up telescopic mast that the Home-Brew 70MHz J-Pole is mounted on. Height above ground level is again approximately 7 metres. The DK7ZB is an excellent twin band Yagi antenna.





Push up aluminium mast with rotator, 2m / 70cm DK7ZB Yagi and a 4m J-Pole at the top



**The DK7ZB 5 + 8 element dual band yagi for 2m and 70 cm - designed by Martin Steyer DK7ZB**

Available from Arthur MØPLK (SQ2PLK) at Ham Radio Shop:

<http://stores.ebay.co.uk/urbasket-eu>

<http://ham-radio.urbasket.eu>

Also available from VPA SYSTEMS by SQ9VPA <http://www.vpa-systems.pl>

Kits available from NUXCOM.de : <http://shop.nuxcom.de>

## **2 Meter J-Pole Antenna for the garden shed - and other J-Pole antennas for 6 metres and 10 metres :**

While experimenting with antennas in the garden in the summer of 2012 I thought that it would be good to have a hand-held radio in the shed to do some monitoring and make a few contacts. To improve upon the performance of the 'rubber duck' antenna I quickly made a J-Pole antenna for the 2 metre band.

It is made from a 47cm length of 450 ohm Wireman ladder line as the 1/4 wave matching section, plus a 97cm length of stranded wire as the 1/2 wave radiator. It is fed with 3 metres of Mil spec RG58 c/u coaxial cable that is soldered to the 1/4 wave matching section's impedance matching point at 3.5 cm from the bottom. The coax feeder is wound around some PVC tube to form a choke. The completed antenna is taped to a 2.2 metre long fibreglass fishing pole that I purchased from Poundland (for £1.00). It took about 20 minutes to make followed by some testing and adjustment with the antenna analyser. The fishing pole is lashed to the shed with some cable ties.

This simple antenna works pretty well, but being so low down signal strengths are not huge, but it's pleasing to get on the air with something so simple and cheap!

[Find out how easy it is to construct J-Pole Antennas here](#)

Now, if it was at the top of my 10 metre long fishing pole. . . . . (!)



**The Shed Antenna - a 2m J-Pole by MØMTJ**

Note the simple choke balun at its base made by winding 8 turns of the coaxial cable around a small off cut of white PVC water pipe.  
[Find out how easy it is to construct J-Pole Antennas here](#)

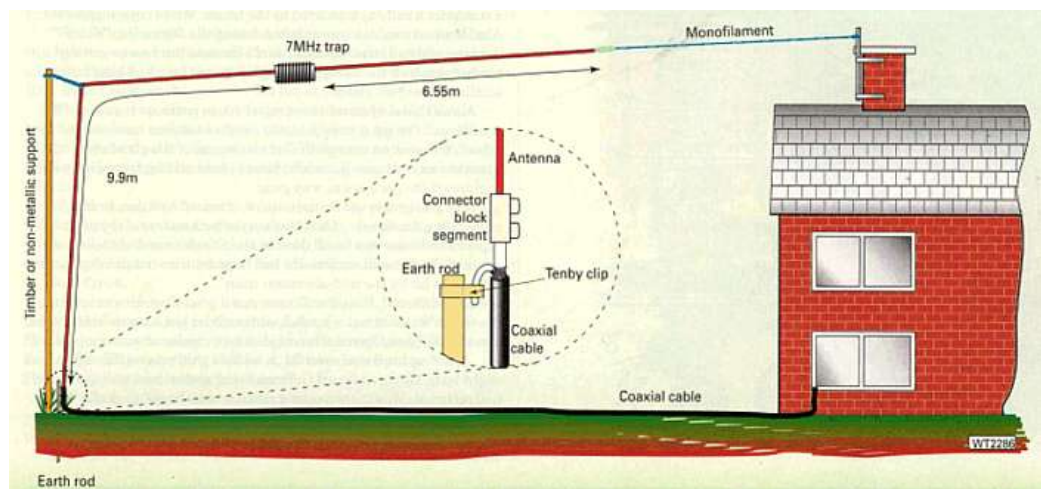


The feed point of a J-Pole antenna made from Wireman 450 ohm ladder line.

[More here](#)

## More Antennas . . .

### Inverted L Antenna for 80m and 40m (and some other HF Bands from 80m to 10m)



The basic layout of the Inverted L Antenna (Practical Wireless)

The first antenna that I installed was for HF. I decided on an Inverted L that incorporates a 7MHz trap so that it can be used on both 7MHz (40 metres) and 3.5 MHz (80 metres).

The design of this Inverted L is well known and a good design has been published previously in Practical Wireless by Len Paget GM0ONX. It is based on one half of the famous W3DZZ trapped dipole antenna.

It can be made entirely from scratch as a DIY project, or the 7MHz trap could be purchased commercially as a ready made item, or whole antenna can bought as a complete kit from Tony Nailer, G4CFY, at Spectrum Communications. I opted to buy the 7MHz trap from Spectrum Communications, as I already had most of the other materials required - rope, egg insulator, plastic box, and some good aerial wire. The Spectrum Communications trap is solid and well made and 'potted' to protect against the elements.

This antenna is tuned for 40 metres and 80 metres, but the VSWR is acceptable on several other bands being in the region of 2:1 to 5:1. The designer anticipated that this antenna would be usable on five of the H.F. bands between 80m and 10m.

I have found that with the use of the Antenna Tuning Unit it can be used on all of the H.F. bands. However the polar radiation pattern may very well be less predictable on bands other than the intended 40 and 80 metres, and it may well be less effective than might be desirable - but it does work!

The antenna is in the back garden, while the shack (radio room) is in a bedroom at the front of the house. It is fed by a 30 metre length of RG213 coaxial cable (it is not possible to use twin feeder for this type of antenna as the Inverted L is an UN-Balanced aerial, whereas twin feeder is balanced). With this length of cable I estimate the loss in the feeder alone to be about 1dB at 7MHz. The feed point of the aerial is located at the base of a 16 foot high wooden pole near the bottom of the garden. The horizontal top wire returns to a fibreglass pole installed at the apex of the roof.

**+ 17 + 160:** I have since added a separate sloping wire element for the 17 Metre Band and a switchable loading coil for Top Band - see notes below...





**Photograph showing the wooden support post and termination point of the Inverted L antenna  
The post is coloured green with green fence treatment to mast it somewhat. I have also placed  
it near the bush to provide further camouflage.**



**The low loss RG213 coaxial cable runs from the shack at the front of the house up into the loft and exits into the back garden down the rear wall, through some garden hose to offer some protection along the flower bed to the bottom of the garden where it is connected to the base of the Inverted L antenna.**





**The suspended Inverted L aerial with 7 MHz trap.**





**The Inverted L antenna - lower section now nicely camouflaged. The wooden support post is some 6 metres long.**

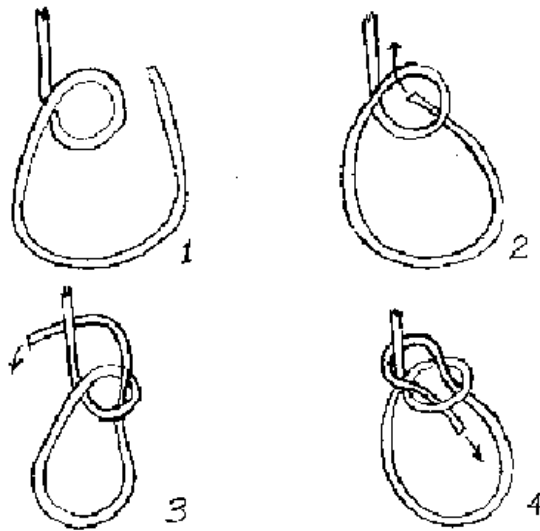




The photograph above shows the Dacron ropes supporting the ends of the Inverted L and Dipole antennas are held in place at the top of the fiberglass support mast by a pulley - one pulley for each support rope. This facilitates rapid lowering of either antenna for adjustment or replacement. This photograph also shows a second rope and pulley system that was originally used to support the 20m dipole and is now used for the top band inverted L wire

aerial.

I needed a good reliable knot for securing ropes when installing wire antennas and have found the Bowline to be one of the most useful, it is strong and easy to tie. A Bowline will not slip in any circumstances and, usefully, the more load that is put on it, the tighter it gets.



**The Bowline Knot**

A Bowline can be used to tie two ropes together and should be used to tie a support rope to a pulley, dipole centre and other antenna items.

It's important to use the correct knot for the job when fixing up wire antennas. I find the Bowline is a very useful for fixing end, egg and dog-bone insulators to the ends of the wire and/or ropes. The Round Turn & Two Hitches, Anchor Bend (Anchor Hitch) and Buntline Hitch knots are very good for tying a rope to a pole or a mast. A Double Sheet Bend can join two pieces of rope together - even if they are of unequal size. 'Animated Knots' will show you how to do them: <http://www.animatedknots.com>



**Photo showing pulley fixed to the top of the wooden support post and the aerial support rope that it holds in place.**



**The Spectrum Communications Trap**



**View of trap showing that the joints have been thoroughly sealed against the weather with self amalgamating tape and silicone sealant.**



**Just for good measure I sealed the internal side of the machine screw that forms the connection terminal against the weather with Watson sealant putty.**

### **Adding Top Band to the 80 / 40 metre Inverted L Antenna:**

Due to an aborted house move in 2010 I had removed all the antennas. While re-establishing the aerials in 2011, and considering space limitations, I decided to experiment with adding a loading coil to the 40m / 80m Inverted L aerial. The loading coil has a link wire to short it out of circuit when using the aerial for 80 metres and 40 metres. The link wire is removed when Top Band is required.

I also took the opportunity to replace the original wooden post with a strong 6 metre tall fibreglass pole.

The coil consists of approximately 37 turns of PVC covered antenna wire wound on a short piece of PVC pipe. Once the required points of resonance were set for 40 metres and 80 metres, the link wire was removed and number of turns on the coil were adjusted until the required point of resonance was found on the 160 metre band. I set it to around 1900 kHz - the bandwidth is quite narrow.



Once the work was done, the joints and connections were sealed with either Liquid Electrical Tape or self amalgamating tape, then the connecting box, V bolts and white PVC pipe were sprayed with green paint to help it all blend in with the surroundings a little better.

### **Adding the 17 Metre (18 MHz) Band to the 80 / 40 metre Inverted L Antenna:**

The Inverted L is not too good for the 'WARC' bands so to obtain better performance on the 17 Metre band I added a single slightly sloping wire element cut for that band. The lower end of the wire is permanently connected to the feed terminal on the junction box, the other end is tied to a small dog bone insulator. This dog bone is then supported by a length of thin para-cord which is tied to the horizontal wire of the main Inverted L element. (N.B. The 17 metre modification is not currently shown in the photographs below.)



Work In Progress! - September 2011

Reconfiguring Inverted L with additional Top Band Loading Coil for 160 metres.  
A strong 6 metre tall fibreglass pole replaces the original heavy wooden post.





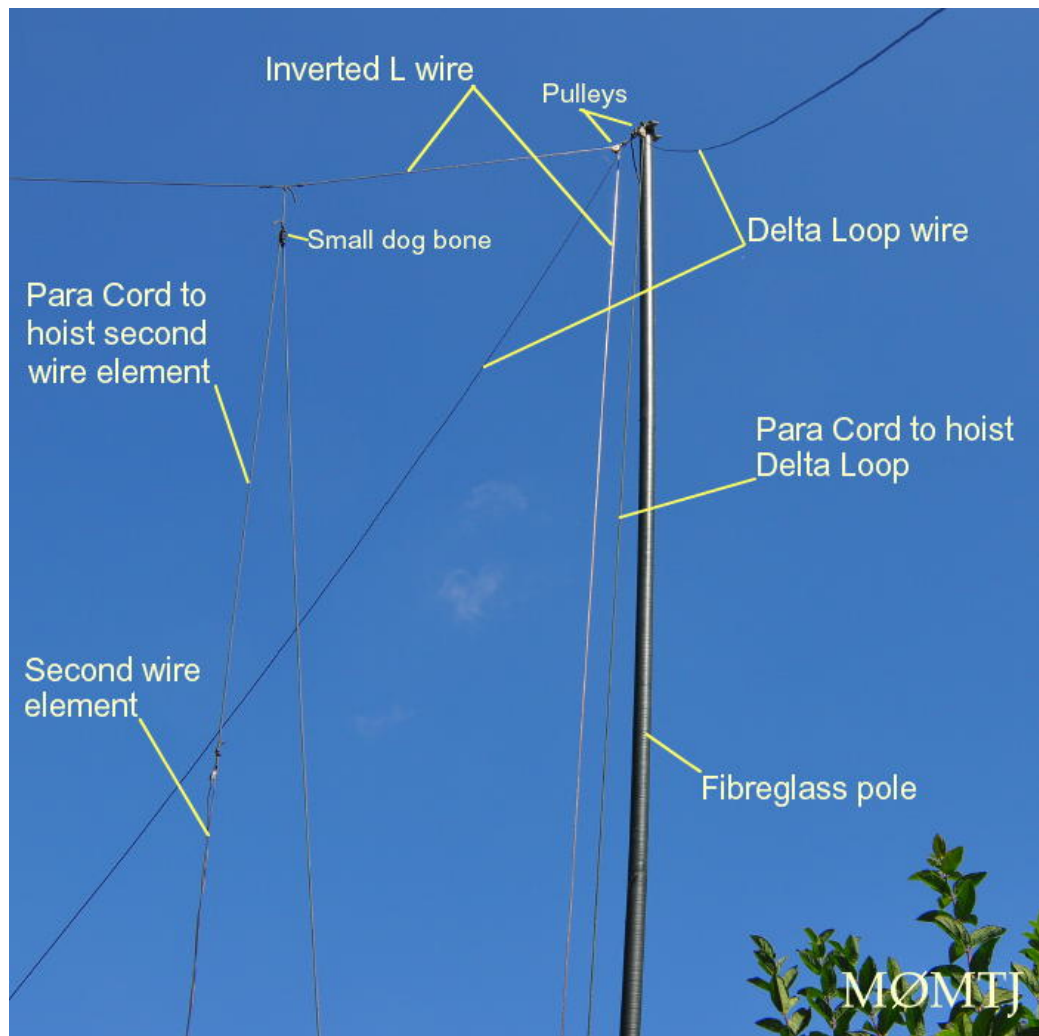
Adding 160 metre loading coil to the 80m / 40m Inverted L Aerial.  
The loading coil has a link wire to short it out of circuit when using the aerial for 80 metres and 40 metres.  
The link wire is removed when Top Band is required.  
The coil consists of approximately 37 turns wound on a piece of PVC pipe.



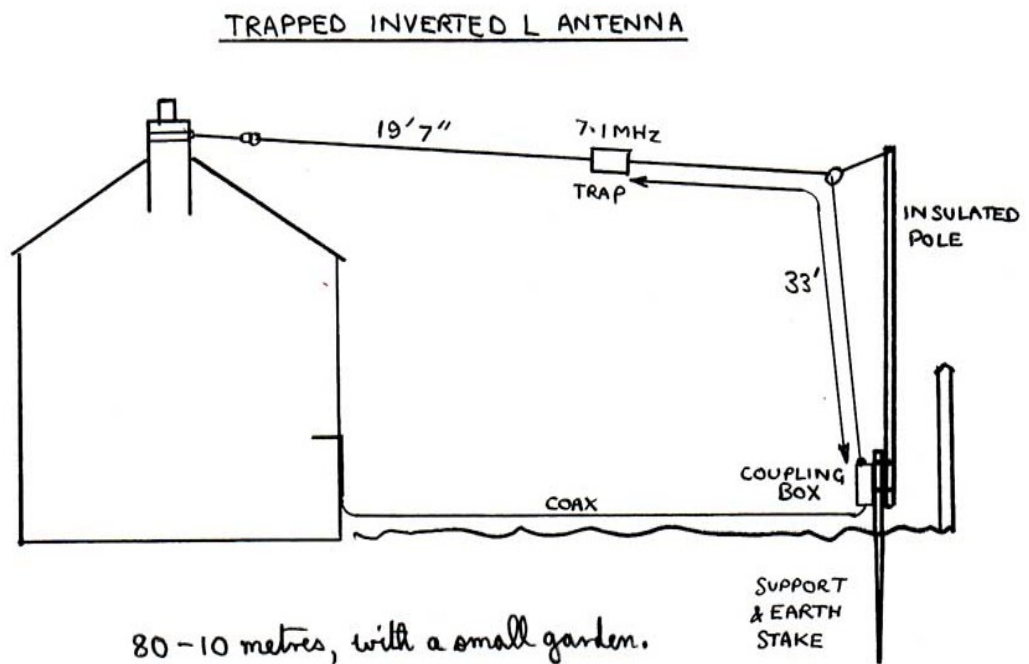


Adding 160 metre loading coil to the 80m / 40m Inverted L Aerial.  
The loading coil has a link wire to short it out of circuit when using the aerial for 80 metres and 40 metres.  
The link wire is removed when Top Band is required.  
The coil consists of approximately 37 turns wound on a piece of PVC pipe.





Photograph showing the Inverted L antenna with additional vertical wire element and position of Delta Loop



The commercial version of the basic 80m - 10m Inverted L is available from Tony Nailer at [Spectrum Communications](http://www.spectrumcommunications.co.uk)

**Important notes on effective Grounding by Jim K8OZ**

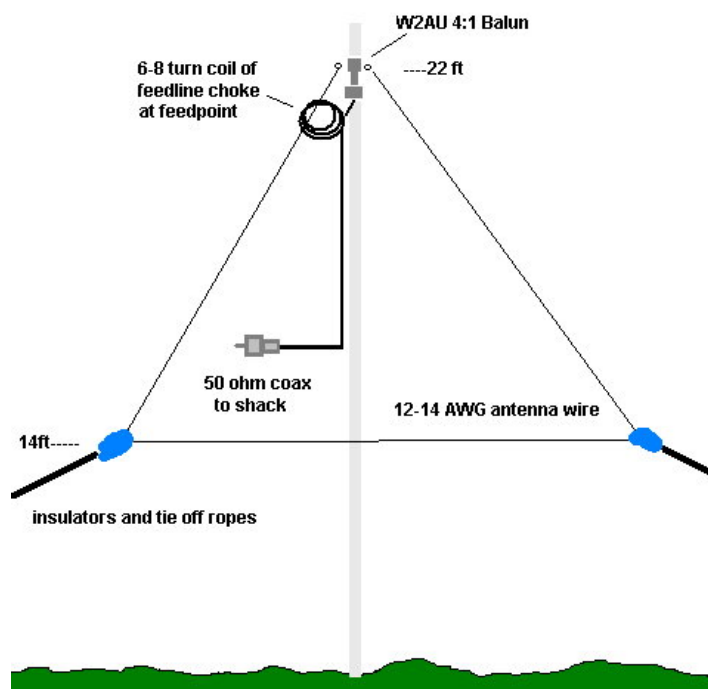
Mike - I was reading about your work on the 160 meter Inverted L, and it makes me want to go out and build some more antennas! Congratulations. Your story is fascinating, and very well documented.

The only thing I can offer as a suggestion is to get as much radial wire along the edge of your property as possible (assuming your XYL will not allow you to bury radial wire all over your yard). Even if you can only run multiple wires 1/8th of a meter apart from each other, and parallel to each other, your losses will be reduced. The ground losses have quite an impact on your transmitted signal, so any wire you can "hide" along the edge of your property will help improve your signal strength - little, by little...! { It may also affect your resonant frequency slightly, but that's easy to deal with by adjusting with an antenna tuner or slightly changing the loading coil. }

Good luck OM, and keep up the refinements on your antenna system. You're doing great! 73,

Jim, K8OZ  
Albuquerque, NM

### Delta Loop Antenna - Tuned for the 17 metre band but also usable as a multi-band operation

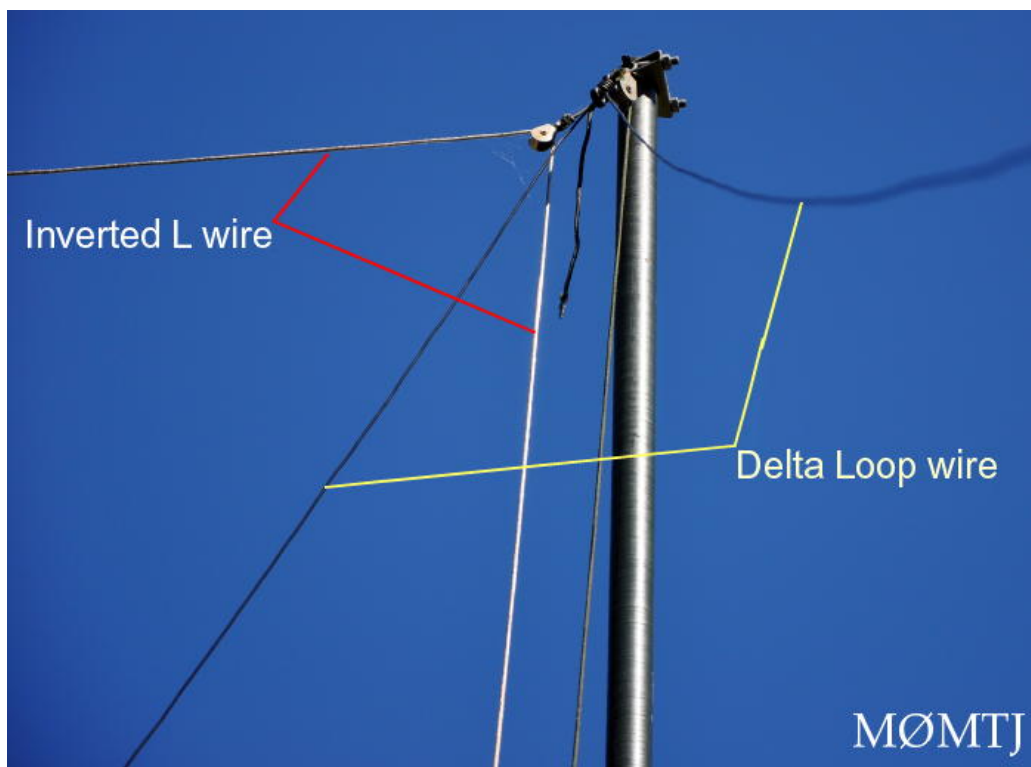


#### A typical Delta Loop antenna - diagram by W5SDC - gives multi-band operation with minimal cost.

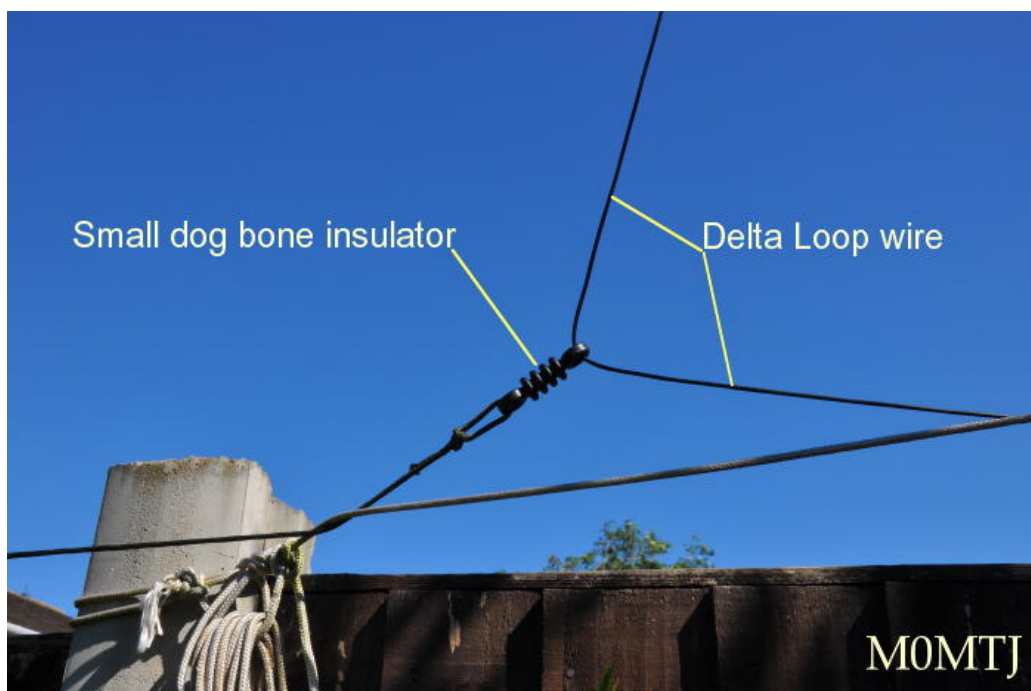
My Delta Loop is fed near the bottom corner - it cannot be fed at the top, as in the diagram above, due to unwanted interaction with the antenna wire of the Inverted L antenna which is supported on the same pole.

My Delta Loop is fed near the bottom at one corner - it cannot be fed at the top, as in the diagram above, due to unwanted interaction with the antenna wire of the Inverted L antenna which is supported on the same pole.

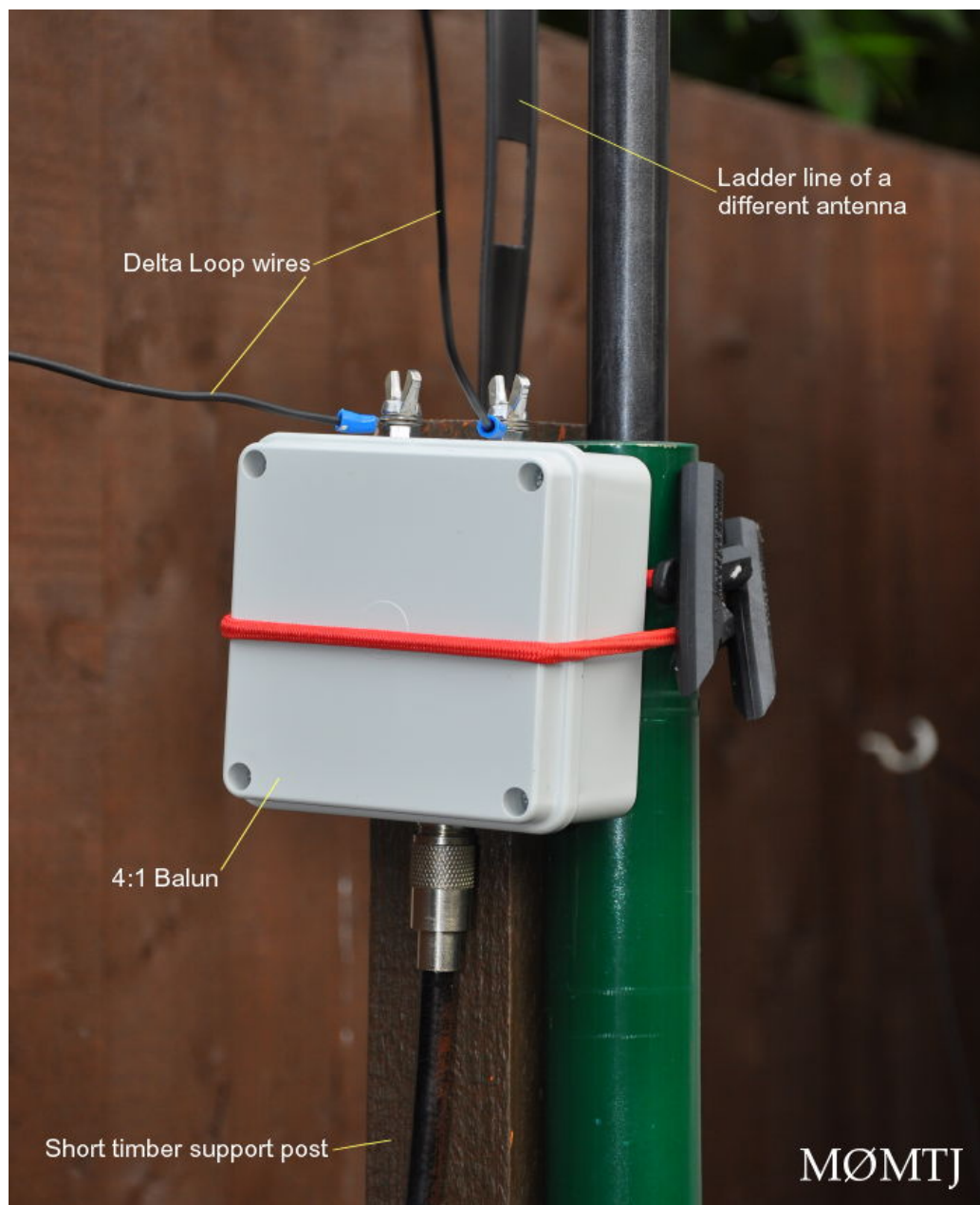
It consists of a 16 metre long loop of wire in triangular Delta shape, hung from the top of the pole supporting the inverted L antenna and fed via RG213 coaxial cable via a home-brew 4:1 balun. A loop is really a single band antenna cut for one wavelength on the band of interest, however it can also work on higher bands with an ATU - as a good, cheap and easy to install multi-band H.F. aerial. Performance is a little better than the inverted L on the higher bands, but on 10 metres the tuned 10 / 6 metre wire 'fan' dipole in the loft can still be better.



Apex of Delta Loop by MØMTJ



Bottom left corner of Delta Loop antenna by MØMTJ



**Feed point of the Delta Loop at the bottom right hand corner**





**The Feed Point of the Delta Loop Antenna is at the bottom right hand corner  
The Antenna is fed via a 'home brew' 4:1 balun by MØMTJ**

Below are the VSWR measurements for the 16 metre long loop which has been measured and cut for resonance in the 17 metre band. For comparison are the measurements for the 12 metre long loop (which has not been optimised) and an 18 metre long loop which is of arbitrary length:

<b>16 metre long loop of wire for the 17 Metre Band (optimised for 17m band)</b>		
<b>BAND</b>	<b>VSWR</b>	<b>VSWR</b>
20m	14.0 MHz = 6.5	14.35 MHz = 4.9
17m	18.07 MHz = 1.2	18.16 MHz = 1.2
15m	21.0 MHz = 3.1	21.45 MHz = 3.7
12m	24.8 MHz = 5.9	25.9 MHz = 6.1
10m	28.0 MHz = 4.1	29.5 MHz = 4.4

<b>12 metre long loop of wire for the 12 Metre Band (NOT optimised)</b>		
<b>BAND</b>	<b>VSWR</b>	<b>VSWR</b>
20m	14.0 MHz = 22.1	14.35 MHz = 21.1
17m	18.07 MHz = 8.4	18.16 MHz = 8.1
15m	21.0 MHz = 5.0	21.45 MHz = 4.6
12m	24.8 MHz = 1.9	25.9 MHz = 2.0
10m	28.0 MHz = 5.0	29.5 MHz = 6.1

<b>18 metre long loop of wire (An arbitrary length between 20m &amp; 17m)</b>		
<b>BAND</b>	<b>VSWR</b>	<b>VSWR</b>
20m	14.0 MHz = 2.1	14.35 MHz = 1.4

17m	18.07 MHz = 2.6	18.16 MHz = 2.5
15m	21.0 MHz = 6.8	21.45 MHz = 8.4
12m	24.8 MHz = 6.3	25.9 MHz = 6.5
10m	28.0 MHz = 2.9	29.5 MHz = 2.5

Many users claim that loop aerials are quieter than typical vertical antennas. There are many plans available in the internet and given a suitable support or pole and a 4:1 balun it can take only a few minutes to install a loop antenna.

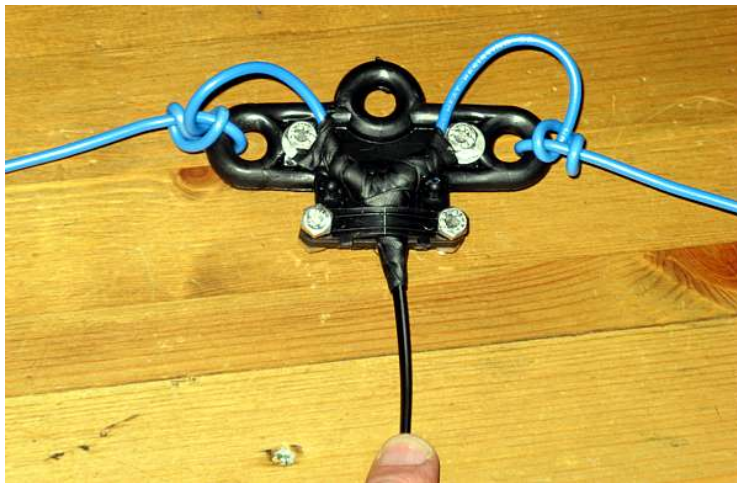
Arthur M0PLK (SQ2PLK) at Ham Radio Shop supplies an interesting lightweight self supporting Delta Loop antenna: <http://ham-radio.urbasket.eu> - see the review on the Polonia DX Award here: [http://pdxa.one.pl/articles.php?article\\_id=17](http://pdxa.one.pl/articles.php?article_id=17)

LOOP ANTENNA LINKS: [See lots more links to Loop Antennas on my links page here](#)

### Dipole or Doublet Antenna for 20m and 10m

This is an antenna trapped dipole for 20m and 10m. Currently it is fed by 75 ohm twin feeder to a 1:1 balun in the loft, then on to the ATU (AMU) via a short RG213 coaxial cable. Although it was initially installed horizontally, it is now installed with one leg supported vertically on a 7 metre fibreglass 'Sota' pole with the other leg supported horizontally about 2 metres above the ground. This is a rather unorthodox arrangement for a balanced dipole, but it seems to work ok and was inspired by another radio amateur's idea - although I don't recommend balanced feeder for this arrangement!

It looks much neater than the horizontally strung dipole and offers a more omnidirectional radiation pattern too.



Dipole Centre with PVC covered wire and 75 ohm twin feeder attached.



Removable end support method for wire dipole using a plastic antenna insulator, snap-hook and Dacron rope.



Photo showing how the wooden support posts are held in the ground by the steel Met Post.  
This Met Post and wooden pole now supports the 7 metre high fibreglass Sota Pole (fishing pole).

#### **The 'deformed dipole'.**

A Dipole for 20m and 10m.

One leg is vertical, giving a more omnidirectional pattern and supported by the 7 metre long fibreglass fishing pole, while the other leg runs off horizontally at about 2 metres above the ground.

This antenna is fed by 75 ohm twin feeder.





The Deformed Dipole

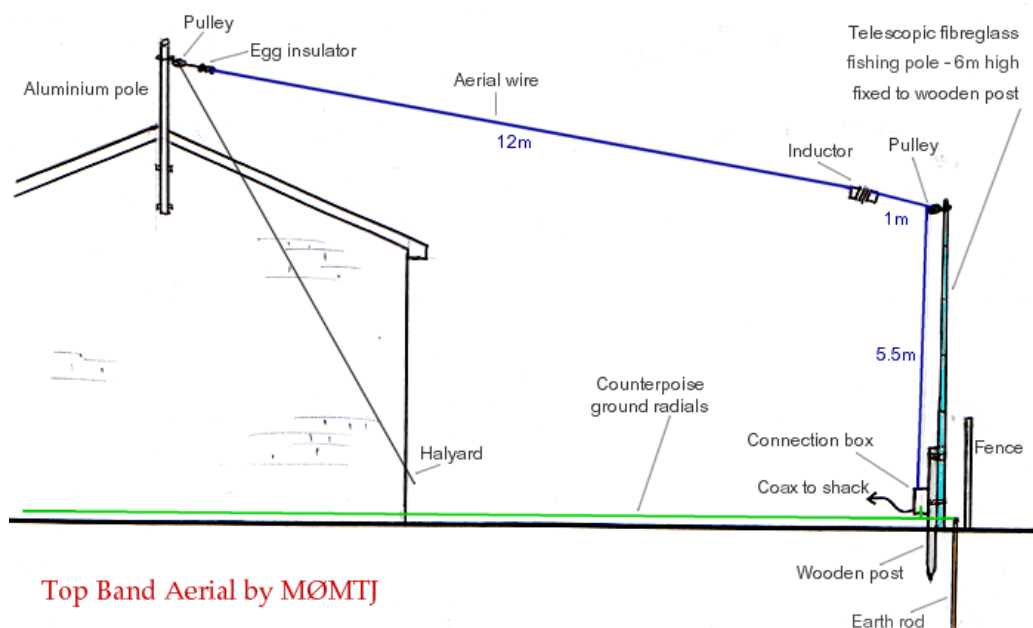


## Compact Antenna for Top Band

### A Shortened Inverted L for 160 Metres

Despite the dreadful noise on top band caused by modern electronic gadgets and the difficulty in accommodating a necessarily large aerial in a small garden, I was keen to try to get on to top band. I experimented with some different ideas during 2009, some of which are shown on [this](#) page.

Eventually I settled on the design shown below. It is an Inverted L type aerial, shortened by the use of a loading coil. It uses a fibreglass telescopic fishing pole to allow it to be easily lowered out of sight when not in use. [Read more on Antennas page 2 here>](#)



Top Band Aerial by MØMTJ

**Shortened Base Loaded Top Band Antenna For Small Gardens**  
uses a fibreglass telescopic fishing pole to allow it to be easily lowered out of sight when not in use.

[Read more about Top Band Antennas on Antennas page 2 >](#)

## Other Antennas:

End Fed Zepp Antennas for 20m / 17m and 15m :



**High quality commercially built Zepp antenna from G Whip Antenna Products.**

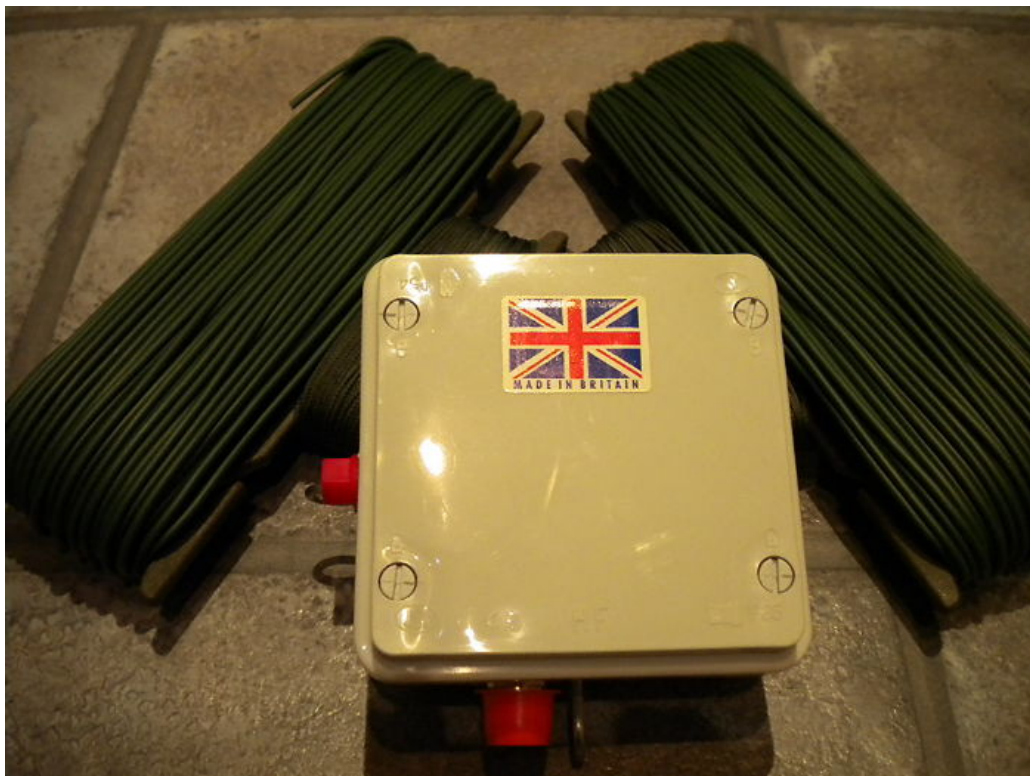
<http://www.gwhip.co.uk/>

Above is a high efficiency, high quality commercially built Zepp style antenna using a half wave radiator. However there is a difference - unlike the traditional Zepp antennas, G4ICD's design dispenses with the long trailing 1/4 wave twin feeder matching section and counterpoise and, instead, uses a G-Whip's helical tuned unit.

The end fed Zepp is extremely versatile - it can simply be hung from the fascia board or guttering just outside one's window: The 1/2 wave wire radiator made of high strength Kevlar is easily sloped down the garden and is a camouflage green in colour so as to be almost invisible. The G-Whip Zepp is supplied with a fascia board insulator, a throwing line with plus cable strain relief and fittings, the IP65 waterproof resin potted box fitted with UHF connectors (SO239) for coax feeder. The Zepp can be mounted vertically (e.g. using a telescopic fibreglass pole), horizontally or sloping and can be ready in a matter of minutes.

I then decided to try an excellent new design developed by Geoff G4ICD - an End Fed Zepp antenna with a difference. The G-Whip End Fed Zepps are high efficiency, resonant mono band antennas utilising a half wave radiator, however this new G-Whip design by G4ICD dispenses with the long trailing 1/4 wave twin feeder matching section and counterpoise and, instead, uses a helical tuned unit. Using versions for 20m, 17m and 15m will enable me to get on the air with the minimum of fuss since the G-Whip end fed Zepp can simply be hung from the fascia board or guttering just outside one's window. The high-strength Kevlar, camouflage green 1/2 wave wire radiator is easily sloped down the garden to be almost invisible.

**G-Whip Widebander :**



**GWhip Widebander antenna.**

Using the popular idea of feeding a large but non resonant antenna with an impedance converting 9:1 unun.

The G Whip wideband antenna consists of a 9:1 unun of GWhip's customary high quality for best efficiency, two 20metre lengths of kevlar wire for the radiator and counterpoise which provide operation from 3.6MHz to 50MHz. Feed with good quality low loss coax and use an ATU to match. The 20 metre radiator wire can be used as a sloper, or supported by convenient supports such as poles or trees in a straight line or 'dog legged'. I use a shorter radiator wire run up a telescopic fibreglass pole for operation on 20 metres and above.

#### **Dual Band J-Pole :**

There is a dual band vertical J-Pole antenna in the loft as a back up for the 2m and 70cm bands.



**The excellent Dual Band N9TAX Slim Jim antenna that I use in the loft as a reserve antenna.**

More information from Joe N9TAX at: [www.n9tax.com](http://www.n9tax.com)  
[www.ebay.co.uk/itm/VHF-UHF-Slim-Jim-J-Pole-Dual-Band-2m-70cm-Antenna-jpole](http://www.ebay.co.uk/itm/VHF-UHF-Slim-Jim-J-Pole-Dual-Band-2m-70cm-Antenna-jpole)

## Previous Antenna installations:

### (2011 - 2013)

1) A trapped Inverted L for 80m and 40m with an SGC-230 auto antenna coupler at its feed-point at the bottom of the garden. RG213 coaxial cable is used to feed the output of the auto-coupler back to the shack. This can be used on all bands from 160 through to 10 metres. The support post is installed at the bottom of the garden with the end of the antenna wire being supported by Dacron rope that is attached to a pulley on a pole at the apex of the roof. A simple, single sloping wire element provides use on the 17 metre band. Although too short to be really effective on 160 metres, Top Band can be tuned by the SGC coupler. A pretty good all-round antenna. [more](#)

2) A half wave Wire J-Pole fixed to a telescopic fibreglass fishing pole for 10m. Cheap and effective. [more about J-Poles](#)

3) A 'home-brew' omnidirectional, vertical dual band, end fed antenna for 2 metres and 70cm. This is of the Controlled Feeder Radiation design (CFR) by VK2ZOL; effectively an end fed half wave dipole on 2m with an aluminium sleeve to achieve 70cms with a few extra dB's of gain. It is mounted on an aluminium mast 10 metres a.g.l. [more](#)

4) A DK7ZB design dual band Yagi antenna, with 5 elements for 2 metres and 8 elements for 70cms, mounted horizontally for SSB. A lightweight antenna rotator is employed and uses a push-up telescopic mast. Height above ground level is again approximately 7 metres. The DK7ZB is an excellent twin band Yagi antenna. [more](#)

5) Dual Band Fan Dipole, made from thick loudspeaker wire, mounted horizontally in the loft space for 10 meters and 6 metres. Cheap & effective.

6) (Installed late September 2013) Wire J-Pole antenna for 4 Metres (70 MHz) supported on a 3 metre long telescopic fibreglass pole to be attached to the top of the aluminium push up mast that supports the DK7ZB dual band yagi and rotator,

### Other Options that can be deployed on an 'as required basis':

7) Compact Loaded Top Band Antenna, based on a design idea by Stuart Craigen G4GTX [more](#)

8 & 9) G Whip End Fed Zepps (EFZ's) for either 20m, 15m or 17m or the G-Whip "WideBander" which is an 'UnTenna' style antenna that can be used for 20m through to 10m using good quality G Whip 9:1 UnUn; useful additions for antenna flexibility. [more](#)

10) N9TAX Dual Band Slim Jim (J-Pole) antenna mounted in the loft as a back-up antenna for 2m and 70cms. Very good. [more](#)

11) Delta Loop Antenna - 16 metre loop of wire in triangular Delta shape, hung from the top of the pole supporting the inverted L antenna and fed via RG213 coaxial cable via a 4:1 balun. The loop is really a single band antenna cut for one wavelength on the band of interest, however it also can be pressed into service for some higher bands - a good, cheap and easy to install aerial; Often works better than the inverted L on the higher bands, but on 10 metres the tuned 10 metre dipole in the loft is sometimes better. [more](#)

### (2011)

In mid 2011 I experimented with an excellent N9TAX designed dual band Slim-Jim (J-Pole) antenna for 2m and 70cms. This is made from lightweight 450 Ohm ladder line which can be fixed to the top of a 10m tall fibreglass, telescopic, fishing pole. The N9TAX works extremely well indeed. More information from Joe N9TAX at: [www.n9tax.com](http://www.n9tax.com) and buy at: [www.ebay.co.uk/itm/VHF-UHF-Slim-Jim-J-Pole-Dual-Band-2m-70cm-Antenna-jpole](http://www.ebay.co.uk/itm/VHF-UHF-Slim-Jim-J-Pole-Dual-Band-2m-70cm-Antenna-jpole)

N.B. I tried to home-brew the DJB-1 dual band J-Pole antenna using plans published by the ARRL in QST magazine. I wanted a neat antenna that could be enclosed in a protective tube to minimise weathering effects. However trying to tune this antenna at UHF frequencies proved to be frustratingly difficult to do and after two full days work I could not get the thing resonate accurately at the correct frequency. Sadly, for this reason, I cannot recommend the Dual Band J-Pole as a home-brew project.

The N9TAX antenna on the other hand works very well. However it cannot be enclosed in a tube due to the velocity factor effect de-tuning the antenna's resonant frequencies.

### (Late 2011)

Due to difficulties with the stability of a lightweight fishing pole as a support I moved back to using the lightweight aluminium telescopic mast, with stays, to support a Watson W-50 vertical dual band collinear for 2 metres and 70 cms FM.



The excellent N9TAX dual band Slim Jim is now installed in the loft.

### (Antennas used up until 2010)

1) A trapped Inverted L for 80m and 40m fed by RG213 coaxial cable to the LDG Z-11 Pro antenna matching unit in the shack. This can be used on all bands from 80 through to 10 metres. The support post is installed at the bottom of the garden with the end of the antenna wire being supported by Dacron rope that is attached to a pulley on a pole at the apex of the roof. This excellent antenna is still use. [more](#)

2) A trapped dipole for 20m and 10m. This was fed by 75 ohm twin feeder to a 1:1 balun then on to the AMU via RG213 coaxial cable. It was initially installed horizontally, but more latterly installed with one leg supported vertically on a 7 metre fibreglass 'Sota' pole with the other leg supported horizontally about 2 metres above the ground. A rather unorthodox arrangement for a balanced dipole, but it seemed to work ok, it looked much neater than a horizontally slung dipole and also offered a more omnidirectional radiation pattern. [more](#)

4) A compact Inverted L for the 160 metre band - Top Band - shortened with a loading coil. [more](#)

5) As N9TAX Dual Band Slim Jim (J-Pole) antenna for 2m and 70cms. This was fixed near the top of a 10m telescopic fibreglass fishing pole that I pushed up whenever it was required. [more](#)

### (2008)

#### **W-2000 - Vertical Collinear mounted on a temporary 10m telescopic pole:**

I no longer have the Watson W-2000 but this is how it was used previously:

The Watson W-2000 covered VHF (2 metres / 144 MHz) and UHF (70 cms / 430 MHz) and also, rather usefully, 6 metres (50 MHz) too. The W-2000 is 2.5 metres long and enclosed in white fibreglass with three radial elements at the base.

Unfortunately I had nowhere practical to install a separate mast for the VHF / UHF antenna, so this was mounted on top of a 30 foot (10 metre) high telescopic aluminium mast in the back garden. The base of the mast was placed in a handy metal sleeved hole that was already present in a small wall in the garden. Very fortunate indeed!

The antenna is connected to the radio via the very low loss Westflex 103 coaxial cable. The cable was left in place permanently, running from the shack in the front bedroom, up into the loft and out of a small hole in the back of the house, down a drain pipe into the back garden. From there the aerial can be connected as an when required:

When VHF or UHF operation is required I have to connect the coaxial cable to the Watson W-2000, fix it to the top of the telescopic mast, which is very quick using two V bolts and 4 wing nuts, put the mast in the hole and raise it to a good height. I tend to extend it so that the bottom of the antenna is at about 24 feet in the air, the height of the apex of the house, so it is in fairly clear space.

A VHF and UHF aerial needs to be as high as possible since at these frequencies communication is essentially local and 'line of sight' - unless heightened propagation conditions, such as Sporadic E or a Temperature Inversion is prevailing at the time.

Even at 24 feet the mast is rather wobbly, so it was tied down using three nylon guy ropes.



The Watson W-2000 on top of the extended telescopic pole - about 8 or 9 metres high.







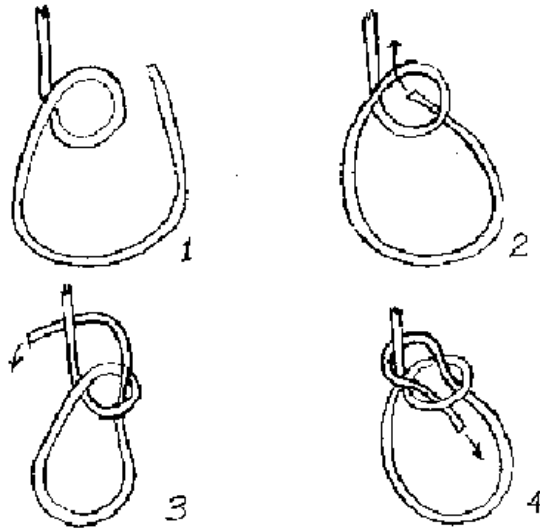
Photograph of a Watson W-2000 on Telescopic Mast at the lowest position.

### **MORE ANTENNAS**

Our good friend in Australia Felix Scerri, VK4FUQ, uses Inverted V antennas but also highly recommends the Quad Loop style antenna for HF work. These are well worth investigating, and you can read more here: [Antennas 3](#) with more antenna ideas on [Antennas 2](#) and [Antennas 4](#) and the Links Page [here](#) and [here](#)

### **KNOTS FOR SECURING WIRE ANTENNAS**

I have found the Bowline to be one of the most useful, it is strong and easy to tie. A Bowline will not slip in any circumstances and, usefully, the more load that is put on it, the tighter it gets. [Read more about good knots for amateur radio aerials here...](#)



[The Bowline Knot - Read more about knots here ...](#)

### **Antenna Trimming Chart and useful Antenna Rigging Accessory ideas**

On Antennas 4 I have included a helpful [Antenna Trimming Chart](#) and some useful ideas for [Antenna Rigging Accessories](#)

[More project ideas here>](#)

73

Mike, MØMTJ 2011 / 2012

[Antennas 2](#) | [Antennas 3](#) | [Antennas 4](#) | [Antennas 5](#) | [Antennas 6](#)

### **Links to further reading:**

Introducing The All Band Doublet: <http://www.cebik.com/content/edu/edu6.html> *N.B. Create a free account at <http://www.cebik.com>*

The All Band Doublet - <http://www.cebik.com/wire/abd.html>

The ALL Band HF Doublet on Ham Universe - <http://www.hamuniverse.com/hfdoublet.html>

Multi Band Dipoles Compared - by ARRL on QST and DX Zone:

<http://www.arrl.org/tis/info/pdf/9611073.pdf> <http://www.dxzone.com/cgi-bin/dir/jump2.cgi?ID=7499>

PDF Document - The W3DZZ Antenna -

<http://www.users.icscotland.net/~len.paget/GM0ONX%20trap%20dipole.pdf> (\*\*!!! But don't use coaxial cable with a 'choke balun' at the centre of the dipole! Use twin feeder with the Choke Balun at the other end. Less power loss.!!!\*\*\*)

See Practical Dipole Antennas Compared: [http://www.qsl.net/ta1dx/amator/practical\\_dipole\\_antenna.htm](http://www.qsl.net/ta1dx/amator/practical_dipole_antenna.htm)

Practical Antenna For 160 Metres - <http://www.iw5edi.com/ham-radio/?a-practical-antenna-for-160-metres.32>  
<http://www.ik1mnj.net/id202.htm>

### **More:**

The website of GM0ONX <http://www.gm0onx.co.uk/>

The Inverted L - PDF document: <http://www.users.icscotland.net/~len.paget/5%20band%20Inverted%20L.pdf>

Adding Top Band To The Inverted L - PDF Document:

<http://www.users.icscotland.net/~len.paget/Inverted%20L%20adding%20top%20band.pdf>

The All Band Inverted L - <http://www.antennex.com/preview/archive3/ltv.htm>

### **Q.T.H. Move in 2010 !%\*?\*!?!?**

We decided that we'd like to move house in 2009, we found a new property in early 2010. My amateur radio aerials were duly taken down and the ham shack packed away. However after months of delays we still had not moved by August 2010, but we were still hoping to move. However after months of messing about and stringing us along our buyer pulled out the very day before we were to exchange contracts later in August 2010.

This cost us a lot of time and a great deal of wasted money. Thank you Mrs xxxxxx :-)

After a wasted year we decided to stay where we were and take the house of the market. Instead we spent the next eight months remodelling and redecorating. No time for playing radio of course and besides everything was still all packed away in boxes!

In mid 2011 I was getting frustrated that I had no radio. So I suppose it's time to think about re-establishing the station and to start planning the installation of some antennas. Of course Jules, my XYL, understandably questions my antennas and experiments!

Due to time constraints I will probably start again with a somewhat temporary antenna. I was thinking along the lines of an "Untenna" - so I installed a 7.2 ish long wire supported on a vertical fibreglass pole with a horizontal 'counterpoise' connected via a 9:1 balun to the coax back to the shack. Of course it is a fairly low efficiency multi-band (wideband) antenna, but easy to get going quickly. The [GWhip Widebander antenna](#) by Geoff Brown G4ICD is possibly the highest quality antenna of this type available, using a very high efficiency, top quality 9:1 UnUn with a 17 meter wire radiator and 10 metre long counterpoise - a very useful, versatile 'all situations' antenna.

As time progressed I re-established my full size trapped Inverted L antenna for 80metres and 40 metres and added a switchable loading coil at its base for use on 160 meters, as described [above](#).

Then I gradually re-established the 2 metres and 70 cms antennas with the vertical W-50 and horizontal dual band DK7ZB Yagi - as detailed above.

[Antennas 2](#) | [Antennas 3](#) | [Antennas 4](#) | [Antennas 5](#) | [Antennas 6](#)

Index To Other Antenna Pages:

[Antennas 1](#) : Aerials used at MØMTJ

[Antennas 2](#) : Including ..... Ideas for compact aerials for Top Band /160 metres

[Antennas 3](#) : Felix Scerri VK4FUQ discusses Loop Antennas, baluns, masts & other antenna related topics

[Antennas 4](#) : Including ..... Many antenna ideas from various sources particularly for multi-band operation & also gives information about

[antenna trimming](#), [knots for wire antennas](#) and useful antenna [rigging accessory](#) ideas.

[Antennas 5](#) : Including ..... Half Wave End Fed aerials for 144 MHz VHF / 430 MHz UHF and 50 MHz 6 Metre band & J-Pole Aerials

[Antennas 6](#) : Including .... Simple and effective H.F. Antenna ideas - Ground Plane and All Band Doublet



[G-Whip Antenna Products](#)

[Geoff Brown G4ICD offers a multitude of high quality solutions for portable, mobile and permanent base installations](#)





**G-WHIP G Pro Whip antennas**

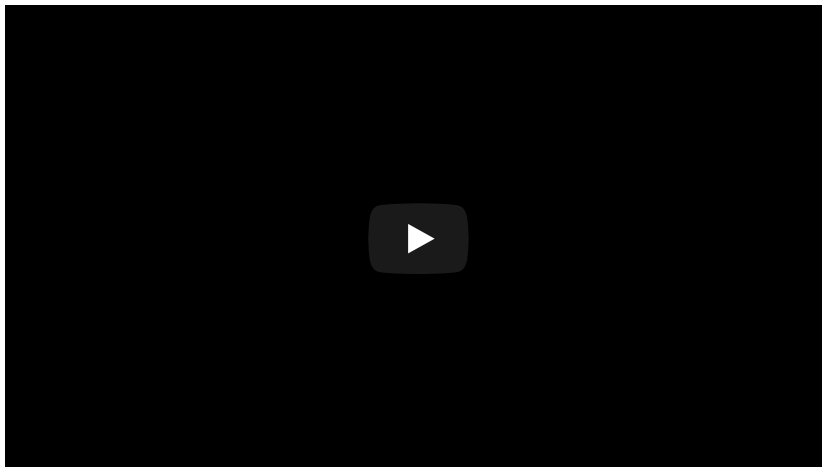
<http://www.gwhip.co.uk/>



<http://www.gwhip.co.uk/>

### Just For Fun:

A tower that we may like to have to attach our antennas to - but I don't think that Health And Safety was taken into account here:





[MØMTJ](#) | [Operating Conditions](#) | [Antennas / Aerials](#) | [/P Portable Operating](#) | [Accessories](#) | [Projects & Kits](#)

[Useful Information](#) | [Contact MØMTJ](#) | [Contact M6ORS](#) | [Links to Amateur Radio Sites](#)

[RSGB](#) | [QSL](#) | [The Amateur Radio Mini Site Map](#)

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